

## WHAT IS CLAIMED IS:

1. A method for adjusting a focal spot position during a scan of a computed tomography imaging system having a z-axis, wherein said computed tomography imaging system includes a detector array having a plurality of detector elements and an x-ray source configured to direct an x-ray beam towards said detector through an object to be imaged,

said method comprising:

turning on the x-ray tube;

reading a z-ratio from the detector;

determining, utilizing the read z-ratio, a shift in a position of a focal spot of the x-ray tube;

using a transfer function to determine an electronic deflection value;  
and

applying the electronic deflection value to the x-ray tube as at least one of a deflection voltage or a deflection current to track the focal spot in the z-axis direction.

2. A method in accordance with Claim 1 further comprising presetting a collimator of the computed tomography imaging system to a default position.

3. A method in accordance with Claim 2 wherein presetting a collimator of the computed tomography imaging system comprises mechanically moving collimator blades.

4. A method in accordance with Claim 1 further comprising determining whether an examination of an object is complete, and further comprising repeating said reading a z-ratio from the detector, determining a shift in a position of a focal spot of the x-ray tube, using a transfer function to determine a compensating electronic deflection value; and applying the electronic deflection value to the x-ray

tube to at least partially track the focal spot in the z-axis direction until the examination is completed.

5. A method in accordance with Claim 1 wherein said computed tomography imaging system is a volume computed tomography imaging system having a coverage between 20 to 200 mm at isocenter.

6. A method for adjusting a focal spot position during a scan of a computed tomography imaging system having a z-axis, wherein said computed tomography imaging system includes a detector array having a plurality of detector elements and an x-ray tube configured to direct an x-ray beam towards said detector through an object to be imaged,

said method comprising:

reading a temperature of the x-ray tube;

obtaining calibration data for a focal spot position of the x-ray tube;

utilizing the tube temperature and calibration data to determine voltages to be applied to a cathode of the x-ray tube; and

applying the determined voltage to the cathode of the x-ray tube.

7. A method in accordance with Claim 6 further comprising presetting a collimator of the computed tomography imaging system to a default position.

8. A method in accordance with Claim 6 further comprising obtaining a transfer function for focal spot position in accordance with x-ray tube temperature.

9. A method in accordance with Claim 8 wherein the computed tomographic imaging system comprises a rotatable gantry and the x-ray tube and the detector are on the rotatable gantry, said method further comprising calibrating focal spot position as a function of gantry speed, tilt, and x-ray tube position.

10. A method in accordance with Claim 9 wherein presetting a collimator of the computed tomography imaging system comprises mechanically moving collimator blades.

11. A method in accordance with Claim 6 wherein said computed tomography imaging system is a volume computed tomography imaging system having a coverage between 20 to 200 mm at isocenter.

12. A computed tomography imaging system comprising:

a detector array having a plurality of detector elements;

an x-ray tube configured to direct an x-ray beam towards said detector array through an object to be imaged;

wherein the x-ray tube and detector array are on a gantry defining a z-axis, and wherein said computed tomography system is configured to electronically adjust a focal spot of said x-ray tube in a z-axis direction to perform z-axis tracking.

13. A system in accordance with Claim 12 wherein said x-ray tube comprises a cathode, said detector array includes z-channel elements, and to adjust a focal spot of said x-ray tube in a z-axis direction to perform z-axis tracking, said computed tomography imaging system is configured to adjust a voltage applied to said x-ray tube cathode.

14. A system in accordance with Claim 13 wherein said x-ray tube further comprises an anode, and said system is further configured to maintain said focal spot at a position constant in the z-axis direction relative to a casing of the x-ray tube and the detector.

15. A system in accordance with Claim 14 further comprising an x-ray collimator, and said system is configured to set said x-ray collimator to a predetermined initial position to collimate said x-ray beam in accordance with a specified slice thickness.

16. A system in accordance with Claim 15 further configured to determine a shift in focal spot position in accordance with z-ratio read from the detector.

17. A system in accordance with Claim 16 further configured to utilize transfer function to determine a cathode bias voltage for said x-ray tube to compensate for the focal spot position shift.

18. A system in accordance with Claim 17 configured to continuously compensate for said focal spot position shift utilizing adjustments of said cathode voltage.

19. A system in accordance with Claim 12 wherein said detector defines an x-direction and said detector is curved in said x-direction, and said system further comprises a collimator having collimator blades curved substantially in proportion to the curvature of said detector in said x-direction.

20. A system in accordance with Claim 12 wherein said x-ray tube comprises a coil, said detector array includes z-channel elements, and to adjust a focal spot of said x-ray tube in a z-axis direction to perform z-axis tracking, said computed tomography imaging system is configured to adjust a current applied to said coil.

21. A computed tomography imaging system comprising:

a detector array having a plurality of detector elements; and

an x-ray tube configured to direct an x-ray beam towards said detector array through an object to be imaged;

wherein the detector array and the x-ray tube are on a gantry defining a z-axis, and the computed tomography system is configured to determine a temperature of said x-ray tube and to electronically adjust a focal spot of said x-ray tube in a z-axis direction in accordance with at least said determined temperature to perform z-axis tracking.

22. A system in accordance with Claim 21 further configured to adjust said focal spot position in accordance with a speed of said gantry, tilt, and x-ray tube position.